Embed & Operate ML Scenarios for your Intelligent Enterprise
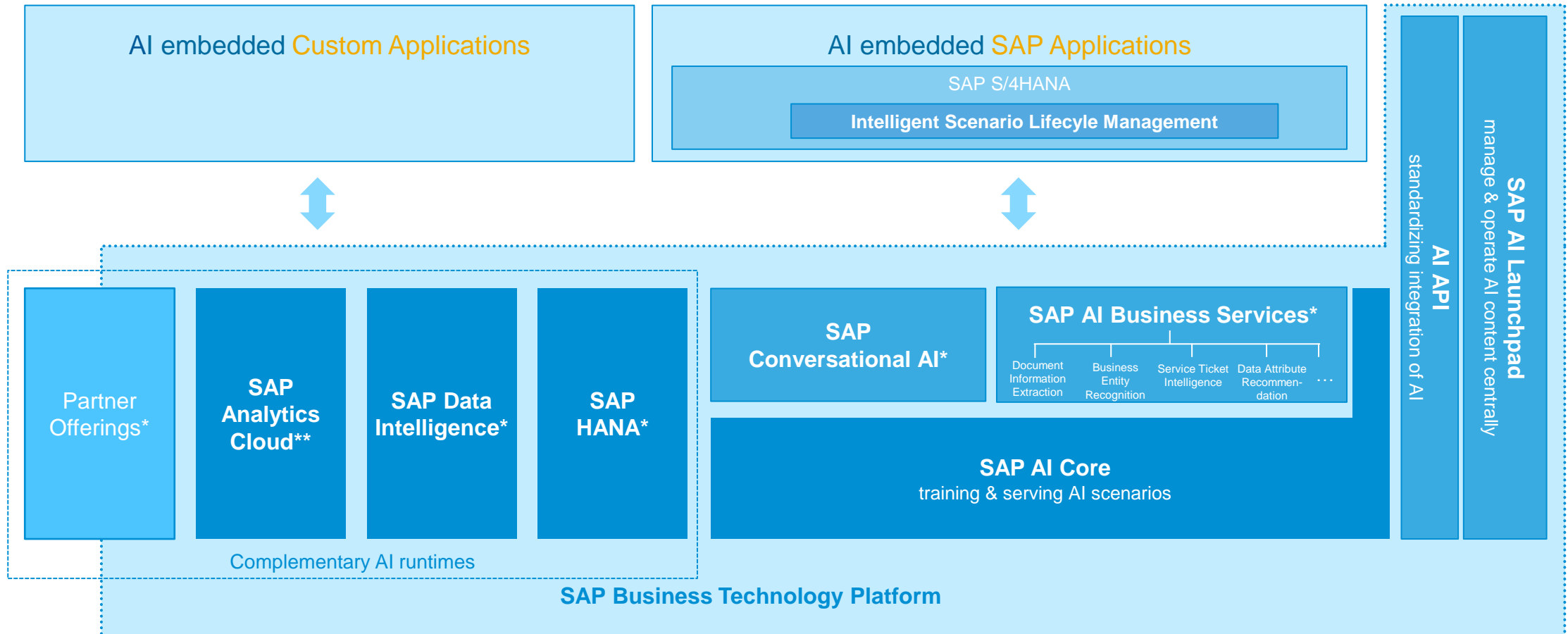
Priti Dhingra, SAP
Ramya Devarajan, SAP
Month 00, 2023

CUSTOMER

Agenda

- SAP AI Technology Portfolio
- Motivation: Standardized integration and operation of machine learning scenarios with SAP S/4HANA

- Intelligent scenario lifecycle management (ISLM)
  - ML operations with & without ISLM
  - Standardized integration of AI in SAP S/4HANA with ISLM

- Demo
- Further information about ISLM

SAP AI Technology Portfolio

AI embedded Custom Applications

AI embedded SAP Applications

SAP S/4HANA

Intelligent Scenario Lifecyle Management

AI API
standardizing integration of AI

SAP AI Launchpad
manage & operate AI content centrally

Partner
Offerings*

**SAP
Analytics
Cloud****

**SAP Data
Intelligence***

**SAP
HANA***

**SAP
Conversational AI***

SAP AI Business Services*

Document
Information
Extraction

Business
Entity
Recognition

Service Ticket
Intelligence

Data Attribute
Recommen-
dation

. . .

SAP AI Core
training & serving AI scenarios

Complementary AI runtimes

SAP Business Technology Platform

* Support for AI API and SAP AI Launchpad is planned for the future
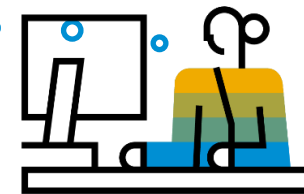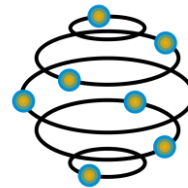** No integration with AI API and SAP AI Launchpad

Intelligent business applications: Initial adoption & ML Ops

How can I get started with SAP delivered ML scenarios?

How can I trigger, control, and monitor the model training?

Does my system meet prerequisites to run SAP delivered intelligent scenarios?
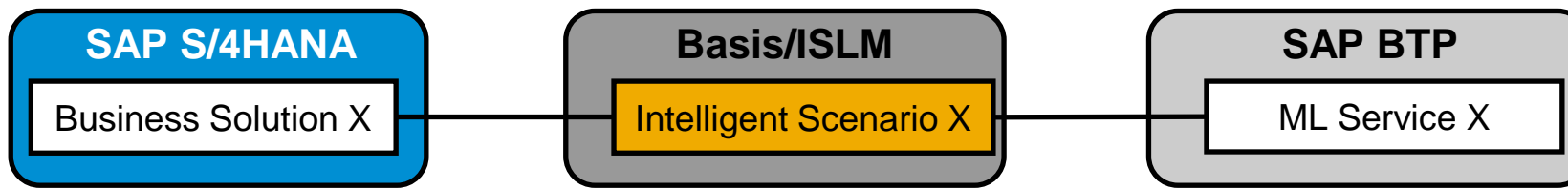
How can I have a better control over productive usage?

Train, monitor, set active . . .

Business Administrator

Motivation: Integrate and operate ML in SAP S/4HANA

Discover and set up scenarios

Prepare training data set, train, and deploy

Activate, test, and make productive use of the inference

Enable efficient operation and management of machine learning scenarios in SAP S/4HANA

SAP S/4HANA	Basis/ISLM	SAP BTP
Business Solution X	Intelligent Scenario X	ML Service X

Goal: Build a harmonized solution for both worlds

Intelligent scenario lifecycle management

Standardized consumption and operation of machine learning scenarios for both flavors

Embedded scenario:
Machine learning provider (such as APL and PAL for SAP HANA) runs in the same stack as the business application (SAP S/4HANA).

Side-by-side scenario:
Machine learning provider runs in a different stack (for example, SAP Data Intelligence and AI solutions for SAP BTP) than the business application (SAP S/4HANA).

Scope: Same solution for shipped and custom developed scenarios

Intelligent scenario lifecycle management

Standardized consumption and operation of machine learning scenarios for both flavors

SAP delivered scenarios (preconfigured):
SAP S/4HANA scenarios in ISLM (ICR, sales order automation, behavioral insights, asset management, and the like)

Custom developed scenarios:
Predictive scenarios based on ML in SAP HANA (APL or PAL); ML scenarios based on SAP AI Core

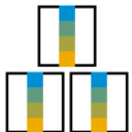# Create , Manage and implement Corrections

Without ISLM

Additional efforts and cost to deliver the ML use case

Added complexity with usage of multiple tools across different stacks

Cumbersome change management during productive usage

Additional complexity to handle inference consumption

With ISLM

Intelligent scenario lifecycle management

Leverage **harmonized and standardized** operational experience with ISLM for scenarios various LOBs

Central cockpit to operate and manage **within SAP S/4HANA stack**

Control about productive usage with an additional step "**activate**".

Simplified inference consumption by **ABAP APIs** or **CDS views** for side-by-side & embedded flavors respectively

# ISLM: Standardized integration of AI in SAP S/4HANA with ISLM

What is ISLM?

- Single-entry point within SAP S/4HANA stack to efficiently integrate and operate ML scenarios.

- Standardized framework delivered in SAP BASIS. ISLM is part of standard SAP S/4HANA license .

- Focus on customer managed use cases (custom developed & SAP delivered).

- ISLM is the Successor of SAP Predictive Analytics integrator
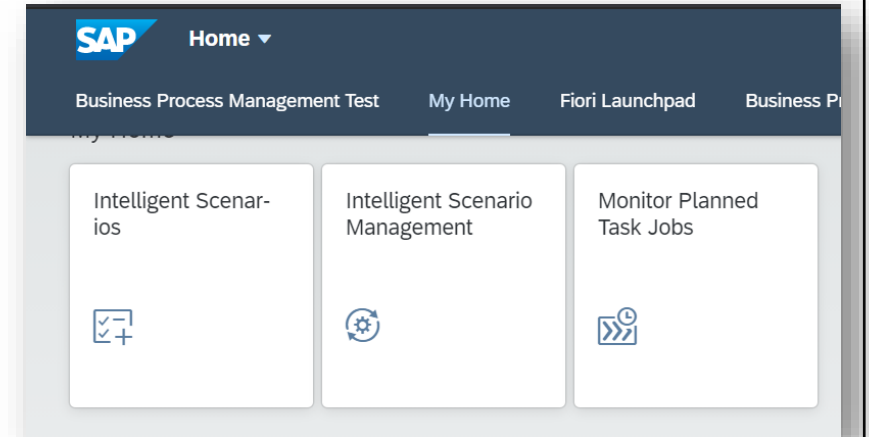
Key benefits:

- Simplified integration of ML capabilities into business applications with minimal coding

- ISLM enables end-to-end lifecycle operations in the context of the business application right from exploration, prerequisite checks, training and activation .

- Supports auditing requirements and simplifies the change management via explicit activation of models.

Intelligent scenario lifecycle management
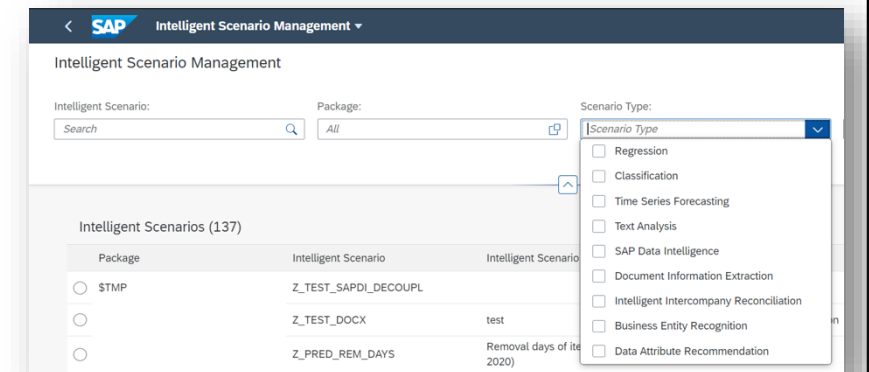
Machine Learning with SAP S/4HANA
Released Use Cases

Use Case	LOB	Scope Item	Scenario Type
Create Sales Orders from Unstructured data	Sales	4X9	SBS
Intelligent Intercompany Reconciliation	Finance	4LG	SBS
Detect Trends of Purchase Contract Quantity Consumption	Sourcing & Procurement	1QR	Embedded
Supplier Delivery Prediction	Sourcing & Procurement	3FY	Embedded
Predict Time-frame for Stock in Transit	Supply Chain	20N	Embedded
Early detection of slow & non-,moving stock	Supply Chain	20N	Embedded
Sales Performance Prediction	Sales	2YJ	Embedded
Process Outsorted Billing Documents	Utilities		Embedded
Behavioral Insights	Services		Embedded

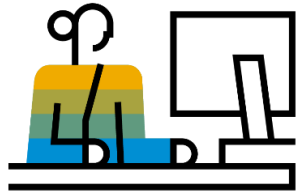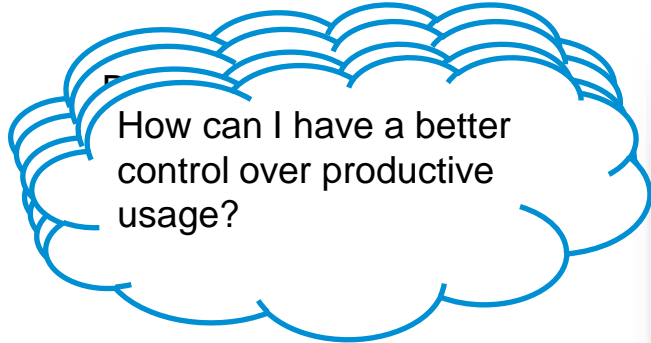## SAP Community Blog

Out-of-the box Intelligent Scenarios

Intelligent Scenarios (7)

	Package	Intelligent Scenario	Line of Business	Status	Intelligent Scenario Description	Scenario Type
○	BEI_ML	BEI_LATE_FILING	Service	Published	Late Filing Prediction	Classification
○		BEI_LATE_PAYMENT	Service	Published	Late Payment Prediction	Classification
○		BEI_RECEIVERSHIP	Service	Published	Receivership Prediction	Classification
○	FIN_ICA_MATCH	ICR_SERVICE	Finance	Published	Intelligent Intercompany Reconciliation	Intelligent Intercompany Reconciliation
○	EAM_ML_ORDER_DAMAGE_CODE	PREDICTDAMAGECODE	Asset Management	Published	Prediction of Damage Code and Code Group for Maintenance Orders (Based on Maintenance Notifications)	Classification
○		PREDICTMAINTOBJPART	Asset Management	Published	Object part prediction in the area of EAM associated to a malfunction in a technical object	Classification
○	RAP_SD_SLS_AUTOEXTRN	SO_AUTO_EXTRACTION	Sales	Published	Intelligent Scenario of Automatic Extraction for Sales Order Creation	Document Information Extraction

PAi migrated scenario

Intelligent Scenarios (17)

Prerequisite Checks

Package	Intelligent Scenario	Line of Business	Status	Intelligent Scenario Description	Scenario Type	Created At
				specific filter combinations		
PPH_DD_VDM_STLM	INDIV_LEADTIME_STO2	Manufacturing	✓ Published	Predicted Individual Lead Time for Stock Transfer	Regression	16.05.2018, 17:18:44 ›
MM_IM_VDM_STOCK	MATERIAL_OVERDUE_SIT	Supply Chain	✓ Published	Stock in Transit material overdue	Regression	22.06.2017, 21:30:44 ›
ODATA_INVOICE_PAYMENT_SI_ML	MMIV_INVC_QTY_BLCK	Sourcing & Procurement	✓ Published	Predictive Scenario for Blocked Invoices with Quantity Variance	Classification	16.02.2018, 21:45:46 ›
ODATA_MM_IM_SLONOMOMAT	MMSLO_CONSUMPTION_01		✓ Published	[Deprecated - do not use] Consumption Data for Slow or Non-Moving Materials	Regression	10.05.2019, 19:41:11 ›
	MMSLO_CONSUMPTION_02	Supply Chain	✓ Published	Consumption Data for Slow or Non-Moving Materials	Regression	22.08.2019, 15:01:43 ›
	MMSLO_STOCK_LEVEL_01		✓ Published	[Deprecated - do not use] Stock Level Data for Slow or Non-Moving Materials	Regression	10.05.2019, 19:44:03 ›
	MMSLO_STOCK_LEVEL_02	Supply Chain	✓ Published	Stock Level Data for Slow or Non-Moving Materials	Regression	22.08.2019, 15:19:17 ›
ODATA_SD_PREDICTED_DELIVERY	PRDTDDELIVCRTNDELAY	Sales	✓ Published	S/4HANA Sales: Predicted Delivery Creation Delay	Regression	14.05.2018, 14:30:02 ›
	PRDTDDELIVPROCGDELAY	Sales	✓ Published	S/4HANA Sales: Predicted Delivery Processing Delay	Regression	11.02.2019, 16:31:10 ›

Initial adoption & ML Ops powered by Intelligent Scenario Lifecycle Management

ISLM: Standardized integration of AI in SAP S/4HANA

- **View AI scenarios**
- **Create an AI scenario**
- **Operate an AI Scenario**

Business user

Business Administrator

Key User

SAP S/4HANA®

Business Application

Intelligent Scenario Lifecycle Management

Embedded

SAP HANA ML (PAL & APL)

Side By Side

ML Platform & Services

SAP DI

Applicati on Services ICR

SAP AI Business Services DOX, BER, DAR, ...

Hyperscaler ML*

Google AI, Azure*

*Planned **

Scenario Type: | All

Created At: | dd.MM.yyyy

- Regression
- Classification
- Time Series Forecasting
- Text Analysis
- SAP Data Intelligence
- Document Information Extraction
- Intelligent Intercompany Reconciliation
- Business Entity Recognition
- Data Attribute Recommendation
- SAP AI Core

Standardized integration of AI in SAP S/4HANA

Intelligent scenario – the binding entity

SAP S/4HANA	Basis/ISLM	SAP BTP
Business Solution X	Intelligent Scenario X	ML Service X
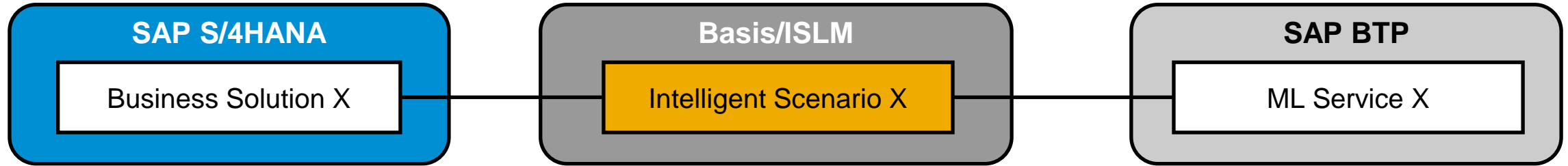
- ISLM introduces a new entity called intelligent scenario per use case.

- Intelligent scenarios are based on one intelligent scenario type where the behavior is defined.

- For SAP S/4HANA shipped scenarios, intelligent scenarios are ABAP objects in your package shipped together with your solution.

- An intelligent scenario binds the business application to its consuming ML service such as in SAP BTP.

- ISLM provides customers control over productive usage with an additional step "activate". This step enables to specify the appropriate trained model to be used in the consuming application.

ISLM: Delivering and consuming ML scenarios with ISLM

SAP development & delivery	Discovery & Evaluation in ISLM	Initial Setup	Operation in ISLM

SAP development & delivery
- ➢ Identify the ML technology & algorithm
- ➢ Create Intelligent scenario in ISLM as a binding entity
- ➢ Publish/deliver intelligent scenario

Discovery & Evaluation in ISLM
- ➢ Explore SAP delivered intelligent scenarios
- ➢ Identify relevant scenarios e.g. LOB specific, check additional information related to consuming business application
- ➢ Check Readiness requirements for an intelligent scenario on a given SAP S/4HANA system

Initial Setup
- ➢ For SAP BTP service based scenarios, create service instance and service key in SAP BTP
- ➢ Maintain connection for the intelligent scenario to connect it to SAP BTP service instance using ISLM

Operation in ISLM
- ➢ Train ML model with customer data
- ➢ Analyze quality of trained ML model.
- ➢ Deploy & Activate to specify which trained model to use in business application
- ➢ SAP S/4HANA model consumption in business scenario

Material Group Proposal [Purchase Requisition]

Procure to Pay

Use Case

Smooth flow of B2B procurement is highly dependent on proper requisition of free-text items. Employees filling out special order requests do often not know correct material groups which can affect corresponding processes which cases additional time and effort for correction.
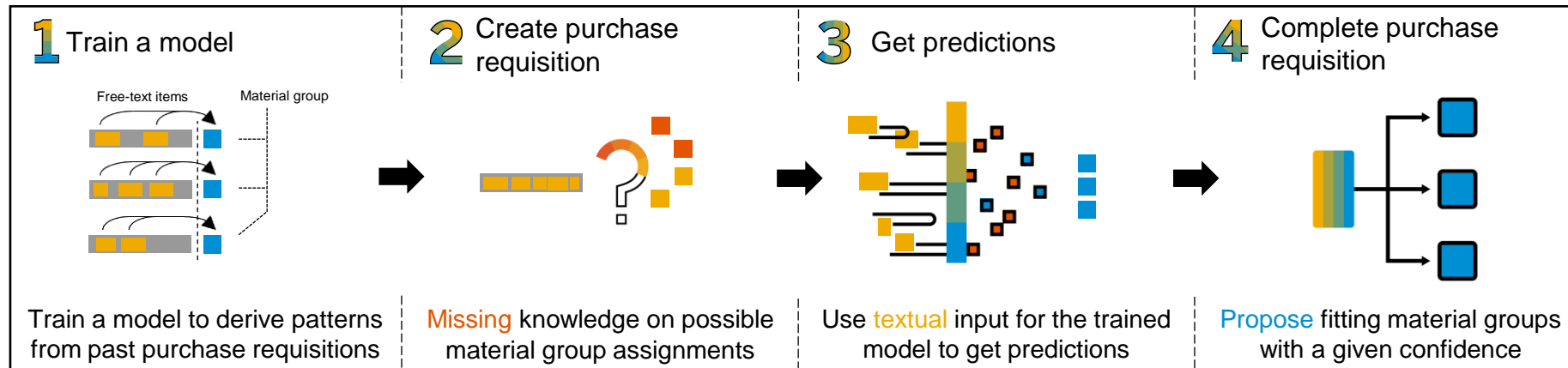
Problem Statement

In many cases free text items are assigned to wrong material groups. The purchasers then need to manually change the material group and assign the correct accounting information so that the follow-on invoice can be posted.

Solution

Simplify the free-text purchase requisitioning process by proposing fitting material groups based on historical free-text purchases.

1 Train a model

Free-text items   Material group

Train a model to derive patterns from past purchase requisitions

2 Create purchase requisition

Missing knowledge on possible material group assignments

3 Get predictions

Use textual input for the trained model to get predictions

4 Complete purchase requisition

Propose fitting material groups with a given confidence
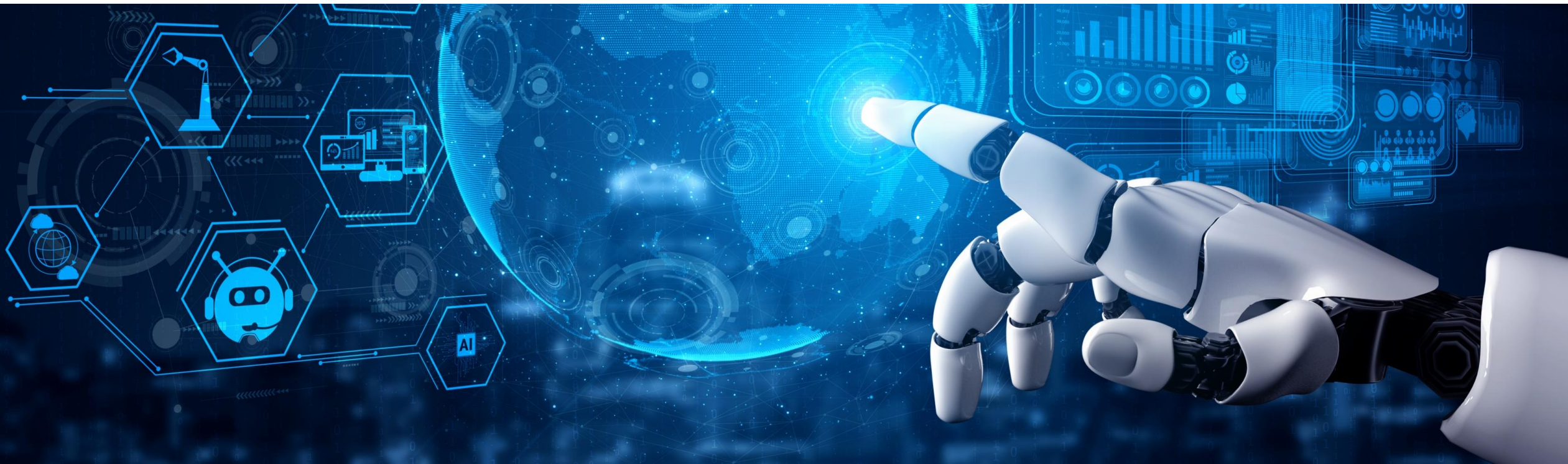
Value Proposition

Automate and ease the ordering process for employees

Reduce the redundancy of manual work for purchasers

Accurate material group allocation results in correct assignments of following processes, preventing additional effort on follow-on processes

Summary: Further Information

Intelligent scenario lifecycle management
Further information

SAP Help links (latest releases)

- [SAP S/4HANA 2021 FPS01](#)

- [SAP S/4HANA Cloud 2202](#)

Web session replays

- [SAP Community Webinar](#)

- [SAP TechEd 2022 Session Replay](#)

- [SAP TechEd 2022 Session Replay](#)

SAP Community blogs and podcast series

- [ISLM – SAP Community Topic Page](#)

- [ISLM Frequently Asked Questions](#)

- [Resources and journey to machine learning with SAP S/4HANA: Blog series](#)

- [Podcast: Enhancements to the Intelligent Scenario Lifecycle Management aka ISLM](#)

SAP Road Map Explorer

[SAP Road Map Explorer:](#) Search for "Machine Learning Scenario Management

Explore ISLM with SAP S/4HANA Fully-Activated Appliance

- ➤ [SAP Cloud Appliance Library](#):

- ➤ [SAP S/4HANA Fully-Activated Appliance](#).

- ➤ [Demo Script](#) for SAP S/4HANA 2022 Fully-Activated Appliance: *Predictive Analytics and Machine Learning*

Thank You.

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